REMARKS

Amendments

Claims 1 and 17 have been amended to clarify that the cooling of the pre-reaction zone *reduces the premature reaction* of the feed-gas mixture in the pre-reaction zone. Support for the amendments is found throughout the Specification, including at paragraphs [0031], [0038], and [0047]. Upon entry of the foregoing amendments, claims 1-4 and 7-28 are pending. Reconsideration of the present application, as amended, and allowance of the pending claims is respectfully requested in view of the following remarks.

Rejection Under 35 U.S.C. § 112

The Examiner has rejected claims 1-10 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Applicants respectfully traverse the rejection.

The written description does not have an *in haec verba* requirement. Thus, support for the claims in the specification may be through express, implicit, or inherent disclosures. As provided by the MPEP, "[t]he fundamental factual inquiry is whether the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed." MPEP § 2163. Support for claims as amended may be found in originally filed claim 3, which provides that the cooling maintained the temperature of the feed gas mixture below 300°C, which is inclusive of the narrower claimed range of about 150°C to about 250°C. Accordingly, the claimed range of the feed gas mixture from about 150°C to about 250°C is inherently supported by the original disclosure. *See, e.g., In re Wertheim*, 541 F.2d 257 (CCPA 1976); *Purdue Pharma L.P. v. Faulding, Inc.*, 230 F.3d 1320 (Fed. Cir. 2000). Accordingly, the rejection is improper and must be withdrawn.

Rejection Under 35 U.S.C. § 103

The Examiner rejected claims 1 and 7-10 under 35 U.S.C. § 103(a) as being obvious over U.S. Patent 6,221,280 to Anumakonda et al. (hereinafter "Anumakonda") in view of Dicks, *Journal of Power Sources*, vol. 61, pg 113-124 (hereinafter "Dicks"). The Examiner rejected claims 2-4 as being unpatentable over Anumakonda in view of Dicks and U.S. Patent 5,567,228 to Abdulally (hereinafter "Abdulally"). The Examiner rejected claims 11-16 as being unpatentable over Anumakonda in view of U.S. Patent 4,331,451 to Isogaya et al. (hereinafter "Isogaya") and U.S. Patent 6,103,143 to Sircar et al. (hereinafter "Sircar"). The Examiner rejected claims 17-28 as being unpatentable over Anumakonda in view of Dicks, Isogaya, and Sircar. Applicants respectfully traverse these rejections.

Anumakonda In Combination with Dicks

The combination of Anumakonda and Dicks fails to teach or suggest the desirability of a *pre-reaction zone upstream of the catalytic reaction zone*. More particularly, neither Anumakonda nor Dicks, alone or in combination, teaches or suggests that *cooling the pre-reaction zone* to maintain the temperature of the feed gas mixture below the flash point *reduces the premature reaction of the fuelgas mixture*. On the contrary, Dicks teaches the desirability of pre-reforming heavier hydrocarbons present in the feed stream *prior* to feeding the gas to the main reactor (Pg. 117, N[8] and accompanying text). Thus, Dicks' teaching directly contradicts Applicants' claimed invention.

Moreover, as Applicants have previously noted, the Applicants' own lexicography teaches that premature reactions should be reduced in the pre-reaction zone, thereby excluding the possibility that the pre-reaction zone comprises a pre-reforming zone. The meaning of "pre-" generally is understood as meaning before or prior to. Thus, "pre-reaction" means before the

reaction, which would exclude pre-reforming (i.e., the conversion of heavy hydrocarbons to lighter hydrocarbons) as taught by Dicks.

Anumakonda In Combination with Dicks and Abdulally

As described above, the combination of Anumakonda and Dicks does not remotely teach or suggest the desirability of cooling a pre-reaction zone upstream of the catalytic reaction zone to reduce the premature reaction of the fuelgas mixture. The combination of Abdulally with Anumakonda and Dicks does not supplement the deficiencies of the combination of Anumakonda and Dicks. On the contrary, Abdulally makes no teaching or suggestion of the desirability of cooling a *pre-reaction zone* upstream of a catalytic reaction zone to *reduce the premature reaction* of a feed gas mixture in the pre-reaction zone.

Moreover, one of ordinary skill in the art would not look to Abdulally to supplement the deficiencies of Anumakonda and Dicks. In addition, Applicants' respectfully disagree with the Examiner's reliance on Abdulally to teach methods of cooling a heavy hydrocarbon feed in the pre-reaction zone. Abdulally teaches a method of cooling high temperature *syngas* after production of the syngas from coal (Col. 1, Lines 14-28). Abdulally does not, however, make any teaching or suggestion of the desirability of cooling a heavy hydrocarbon feed gas in a pre-reaction zone *before* conversion of the heavy hydrocarbon feed gas to syngas.

Anumakonda In Combination with Isogaya and Sircar

Anumakonda, Isogaya, and Sircar, alone or in combination, fail to teach or suggest a *post-reaction zone maintained at a temperature greater than about 600°C*, as required by Applicants' independent claims 11 and 17. More particularly, none of the references teach or suggest the desirability of maintaining the temperature of the exit gas *after* leaving the reaction

zone *until the conversion of the feed gas mixture to hydrogen and carbon monoxide is substantially entirely complete.*

Applicants respectfully disagree with the Examiner's assertion that the gas of Isogaya must be *maintained* at a temperature of at least 600°C *after* exiting the reaction zone as required by Applicants' claims. Office Action dated March 26, 2007, Page 10, ¶ 2. On the contrary, Isogaya teaches only that the product gas has a temperature of from 800°C to 1100°C upon exiting the *catalyst bed* and makes no teaching or suggestion that it would be desirable to *maintain* a higher temperature *after* exiting the reaction zone. See, e.g., Col. 13, Lines 55-58.

Applicants also respectfully disagree with the Examiner's assertion that Sircar's teaching of a increasing temperature gradient in the reactor itself would be sufficient to teach one of ordinary skill in the art the desirability of maintaining the temperature of the gas *after* exiting the catalyst bed until *conversion of the feed gas mixture to hydrogen and carbon monoxide is substantially entirely complete.* Office Action dated March, 26, 2007, Page 9, ¶¶ 3-4. On the contrary, Sircar teaches that an increasing temperature *along the length of the catalyst bed* within the reactor may be beneficial to drive the reaction to completion *before* the gas exits the catalyst bed. See, e.g., Col. 9, Lines 36-50 and Col. 10, Lines 6-10. Thus, neither Isogaya nor Sircar remotely teach or suggest that the product gas temperature should be *maintained* at a particular temperature *after exiting* the reaction zone.

Anumakonda In Combination with Dicks, Isogaya, and Sircar

Applicants' respectfully refer the Examiner to the arguments made hereinabove distinguishing the Applicants' claimed invention from the combination of Anumakonda and Dicks and the combination of Anumakonda, Isogaya, and Sircar.

The rejections are unsupported by the prior art and must be withdrawn, as a case of *prima facie* obviousness clearly is lacking.

Conclusions

For the foregoing reasons, Applicants submit that claims 1-4 and 7-28 are novel and nonobvious in view of the prior art. Allowance of the pending claims is therefore earnestly solicited.

If there are any issues which can be resolved by a telephone conference or an examiner's amendment, the Examiner is invited to telephone the attorney at (404) 853-8012.

Respectfully submitted,

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